6.7 Weight of Generator Rotor:

The preliminary weight of generator rotor can be determined from IS 12800 or as per other standard codes and best practice.

6.8 Layout of powerhouse

6.8.1 Position of unit bays and erection bays

Unit bay is the main feature, consisting unit turbine and generator set, about which other areas are grouped. Hence, size and layout of power depends on arrangement of multiple unit bays. Unit bays may be arranged in single row or multiple rows. If the site condition doesn't favor all the units in the same row, which increases powerhouse length, the units can be arranged in two rows making same elevation level of turbine but varying outlet of draft tube.

6.8.2 Dimension of Powerhouse

The dimension of powerhouse depends on;

a. Unit bays
b. Erection bay
c. Service areas

6.8.2.1 Unit bays

Unit bays consist of main components of generating units. As already stated, size of unit bay depends upon size of turbine and generators. One more element affecting the size is spiral casing which is the one covering more floor area in each unit bays.

6.8.2.2 Erection Bay

Erection bay can be placed either at end or in the center of a multi-unit hydro plant. In underground plants it is usually near the access tunnel. It is continent to keep level of erection bay same as generator floor.

6.8.2.3 Service Areas

Service areas include offices, control and testing rooms, storage rooms, maintenance shop, auxiliary equipment room, and rooms for special uses. The offices are frequently located on upper floors, and the control room and other service rooms on lower floors.

6.8.3 Spiral Casing

There are two types of spiral casing; metallic and concrete spiral casing. For the height above 30m, metallic spiral casing is used. The major dimensions of spiral casing can be determined from IS 12800 or as per other standard codes and best practice.

- **Distance Between Units**

To determine the center distance between two units, the above space determining components should be drawn in plan. The outer diameter of generator barrel should be determined by adding 0.5 to 1.5m in size of inner diameter of generator barrel. After then, a clearance space of 1.5m to 2m should be added to each side of extremities to determine unit bays space.

Major dimensions can be determined from IS 12800 or as per other standard codes and best practice.

- **Erection Bay**

In general, the length of erection bay should be located at the end of the generator room, at the same floor level if possible. The length of erection bay should be at least the size of one-unit bay.

- **E.O.T. Crane**

The length of EOT crane track should be such that it should allow crane to handle equipment of all the units.

The safe working load of E.O.T crane should be at least 125% of maximum load to be handled. The following codes can be referred for design and selection of EOT and gantry cranes:

IS:3177-1999- Code of practice for Electrical Overhead Traveling Cranes and Gantry Cranes

IS: 807- Structural design of crane

6.8.4 Powerhouse Length

The overall length of powerhouse should be

L= No. of units times unit spacing + Length of erection bay + Length required for EOT crane to handle last unit which is usually 3-5 m.

Reference of IS 12800 or as other standard codes and best practice can be taken.

6.8.5 Powerhouse Width

In the drawing of plan showing space determining components, the powerhouse downstream superstructure column should be in distance of 2 to 5 m. Whereas in the upstream side, provision should be made for;

a) Clearance of about 1.5 to 2m for concrete the upstream of scroll case
b) Gallery of 1.5 to 2m width for approaching the draft tube manhole.
c) Main inlet valve is accommodated as per IS 7326.
d) A clearance of 1.5 to 2m is required for pressure relief valve in scroll casing.

Reference of IS 12800 or as other standard codes and best practice can be taken.

6.8.6 Height of Powerhouse

The height of powerhouse from base of draft tube to centerline of spiral casing is obtained from IS 5496 and the height of powerhouse from centerline to the top of generator is obtained as;

Height= Length of stator frame + Height of load bearing bracket + (5.5 to 7m depending upon the size of machine)

The height of machine hall above the top bracket depends on the EOT crane level and clearance required between the ceiling and the top of crane which are determined according to clearance required for moving major items of equipment like runner, generator, shaft, main transformer